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     (FILE 'HOME' ENTERED AT 13:39:18 ON 22 MAR 2005)

     FILE 'HCA' ENTERED AT 13:39:25 ON 22 MAR 2005
L1             35 SEA ABB=ON  PLU=ON  GRAH ?/AU
L2            616 SEA ABB=ON  PLU=ON  HAVENS ?/AU
L3              0 SEA ABB=ON  PLU=ON  L1 AND L2
                  E GRAH MICHAEL ?/AU
L4              9 SEA ABB=ON  PLU=ON  ("GRAH MICHAEL D"/AU OR "GRAH
                  MICHAEL DANIEL"/AU)
                  E HAVENS MARVIN?/AU
                  E HAVENS MARVIN R/AU
L5             26 SEA ABB=ON  PLU=ON  ("HAVENS MARVIN R"/AU OR "HAVENS
                  MARVIN RUSSEL"/AU OR "HAVENS MARVIN RUSSELL"/AU)
L6              0 SEA ABB=ON  PLU=ON  L4 AND L5
                  D SCAN L4
L7              2 SEA ABB=ON  PLU=ON  NANO? AND L4
                  D SCAN
L8              1 SEA ABB=ON  PLU=ON  NANOCOM? AND L4
                  D ALL
L9              0 SEA ABB=ON  PLU=ON  NANOCOM? AND L5
L10             0 SEA ABB=ON  PLU=ON  NANO? AND L5
L11         18806 SEA ABB=ON  PLU=ON  PACK?(2A)FILM?
L12            13 SEA ABB=ON  PLU=ON  L11 AND L5
L13             1 SEA ABB=ON  PLU=ON  L11 AND L1
                  D SCAN
                  D ALL
                  D SCAN L12
L14         18761 SEA ABB=ON  PLU=ON  NANOTUB?
L15             6 SEA ABB=ON  PLU=ON  L14 AND L11
                  D SCAN
                  E NANOTUB?/CT
L16         15848 SEA ABB=ON  PLU=ON  (CARBON OR C)(A)NANOTUB?
L17        339865 SEA ABB=ON  PLU=ON  (PACK? OR WRAP? OR CONTAIN?)(2A)(FILM
                  ? OR THINFILM? OR LAYER? OR OVERLAY? OR COAT? OR
                  OVERCOAT? OR SHEATH? OR COVER? OR ENVELOP? OR ENCASE? OR
                  ENWRAP? OR OVERSPREAD?)
L18           250 SEA ABB=ON  PLU=ON  L16 AND L17
L19             5 SEA ABB=ON  PLU=ON  L16 AND L11
                  D SCAN
L20         27806 SEA ABB=ON  PLU=ON  (NONIONIZ? OR NON(W)IONIZ? OR
                  IONIZ?)(2A)RADIAT?
L21             0 SEA ABB=ON  PLU=ON  L18 AND L20
L22        701365 SEA ABB=ON  PLU=ON  RADIAT?
L23            12 SEA ABB=ON  PLU=ON  L22 AND L18
                  D SCAN
L24         45063 SEA ABB=ON  PLU=ON  (SINGL? OR ONE)(2A)(WALL? OR LAYER?)

L25          4831 SEA ABB=ON  PLU=ON  L24 AND L16
L26            28 SEA ABB=ON  PLU=ON  L24 AND L18
L27        313236 SEA ABB=ON  PLU=ON  NONIONIZ? OR IONIZ?
L28             1 SEA ABB=ON  PLU=ON  L27 AND L18
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                  D SCAN
L29         95265 SEA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR GAS?)(A)(BARRI
                  ER? OR PRESSUR? OR TRANSMI? OR ATMOSPHER? OR ATM#)
L30             6 SEA ABB=ON  PLU=ON  L29 AND L18
L31       1766140 SEA ABB=ON  PLU=ON  ULTRVIOLET? OR UV# OR XRAY? OR
                  X(W)RAY? OR (ELECTRON# OR E)(A)BEAM? OR VISIBL?(A)LIGHT
                  OR INFRARED? OR IR
L32            30 SEA ABB=ON  PLU=ON  L31 AND L18

     FILE 'REGISTRY' ENTERED AT 14:43:22 ON 22 MAR 2005
                  E POLYVINYL ALCOHOL/CN
                  E PVA/CN
L33             2 SEA ABB=ON  PLU=ON  PVA/CN
                  D SCAN
                  D L33 RN
                  D L33 1-2 RN
L34             1 SEA ABB=ON  PLU=ON  9003-20-7/RN
                  D ALL
L35             1 SEA ABB=ON  PLU=ON  9002-89-5/RN
                  D SCAN
                  D L35 FIDE
                  E VINYLIDENE CHLORIDE POLYMER/CN
L36             1 SEA ABB=ON  PLU=ON  VINYLIDENE CHLORIDE POLYMER/CN
                  D SCAN
                  D L36 RN
L37             1 SEA ABB=ON  PLU=ON  9002-85-1/RN
                  D SCAN
                  E ETHYLENE/VINYL ALCOHOL COPOLYMER/CN
                  E ETHYLENE-VINYL ALCOHOL COPOLYMER/CN
L38             1 SEA ABB=ON  PLU=ON  ETHYLENE-VINYL ALCOHOL COPOLYMER/CN
                  D L38 RN
                  E 25067-34-9/RN
L39             1 SEA ABB=ON  PLU=ON  25067-34-9/RN
                  D SCAN
                  E POLYALKYLENE/CN
                  E POLYALKYLENE CARBONATE/CN
                  E ALKYLENE CARBONATE POLYMER/CN
                  E POLYESTER/CN
                  E -25
                  E POLYESTERS/CN
                  E POLYESTER/CN
                  E POLYESTER/CI
                  E POLY?/CI
                  E POLYESTER/PCT
L40        183597 SEA ABB=ON  PLU=ON  POLYESTER/PCT
                  E POLYALKYLENE CARBONATE/PCT
                  E POLYVINYL ALCOHOL/PCT
                  E PVA/PCT
                  E POLYACRYLONITRILE/CN
                  E POLYACRYLONITRILE/PCT
L41             1 SEA ABB=ON  PLU=ON  POLYACRYLONITRILE/CN
                  D RN
L42             1 SEA ABB=ON  PLU=ON  25014-41-9/RN
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                D SCAN
                E POLYAMIDE/CN
                E POLYAMIDE/PCT
L43       82135 SEA ABB=ON  PLU=ON  POLYAMIDE/PCT

     FILE 'HCA' ENTERED AT 15:07:37 ON 22 MAR 2005
L44       57463 SEA ABB=ON  PLU=ON  L35

     FILE 'REGISTRY' ENTERED AT 15:08:57 ON 22 MAR 2005
                D L35

     FILE 'HCA' ENTERED AT 15:10:06 ON 22 MAR 2005
L45       45043 SEA ABB=ON  PLU=ON  PVA OR POLYVINYL(W)ALCOHOL? OR
                ETHANOL(A)HOMOPOLYMER
L46       68914 SEA ABB=ON  PLU=ON  L44 OR L45 OR PVA
L47        5953 SEA ABB=ON  PLU=ON  L37
L48        2610 SEA ABB=ON  PLU=ON  (VINYLIDENE(W)CHLORIDE)(A)(POLYMER
                OR HOMOPOLYMER)
L49        7812 SEA ABB=ON  PLU=ON  L47 OR L48
L50          89 SEA ABB=ON  PLU=ON  POLYALKYLENE(A)CARBONATE
L51        6527 SEA ABB=ON  PLU=ON  L39
L52        5632 SEA ABB=ON  PLU=ON  ((ETHYLENE(A)VINYL)(A)ALCOHOL)(A)COPO
                LYMER#
L53        7037 SEA ABB=ON  PLU=ON  L51 OR L52
L54      294965 SEA ABB=ON  PLU=ON  L40
L55      307973 SEA ABB=ON  PLU=ON  POLYESTER?
L56      447714 SEA ABB=ON  PLU=ON  L54 OR L55
L57       15049 SEA ABB=ON  PLU=ON  L42
L58       22295 SEA ABB=ON  PLU=ON  POLYACRYLONITRILE?
L59       25971 SEA ABB=ON  PLU=ON  L57 OR L58
L60      128236 SEA ABB=ON  PLU=ON  L43
L61      155909 SEA ABB=ON  PLU=ON  POLYAMIDE#
L62      220258 SEA ABB=ON  PLU=ON  L60 OR L61
L63      680508 SEA ABB=ON  PLU=ON  (L45 OR L46 OR L47 OR L48 OR L49 OR
                L50 OR L51 OR L52 OR L53 OR L54 OR L55 OR L56 OR L57 OR
                L58 OR L59 OR L60 OR L61 OR L62)
L64          37 SEA ABB=ON  PLU=ON  L18 AND L63
L65          69 SEA ABB=ON  PLU=ON  L19 OR L23 OR L26 OR L28 OR L30 OR
                L32
L66          94 SEA ABB=ON  PLU=ON  L65 OR L64
L67           5 SEA ABB=ON  PLU=ON  L66 AND L11
                D QUE L18
                D QUE L17
L68       63127 SEA ABB=ON  PLU=ON  (PACK? OR WRAP? OR SHEATH? OR COVER?
                OR ENVELOP? OR ENCASE? OR ENWRAP?)(2A)(FILM? OR THINFILM?
                 OR LAYER? OR OVERLAY? OR COAT?)
L69          75 SEA ABB=ON  PLU=ON  L68 AND L16
L70          16 SEA ABB=ON  PLU=ON  L69 AND L24
L71           2 SEA ABB=ON  PLU=ON  L69 AND L22
L72           0 SEA ABB=ON  PLU=ON  L69 AND L27
L73           1 SEA ABB=ON  PLU=ON  L69 AND L29
L74           7 SEA ABB=ON  PLU=ON  L69 AND L31
L75      680508 SEA ABB=ON  PLU=ON  L44 OR L63
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L76            5 SEA ABB=ON  PLU=ON  L75 AND L69
L77           26 SEA ABB=ON  PLU=ON  (L70 OR L71 OR L72 OR L73 OR L74) OR
                 L76
                 D QUE STAT
                 D QUE L29
L78        34130 SEA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR GAS?)(2A)(PERM
                 EA? OR PERVIOUS? OR IMPERVIOUS? OR IMPERMEA? OR SEMIPERME
                 A? OR NONPERMEA?)
L79       176357 SEA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR GAS?)(2A)(BARR
                 IER? OR PRESSUR? OR TRANSMI? OR ATMOSPHER? OR ATM#)
L80            1 SEA ABB=ON  PLU=ON  L69 AND (L78 OR L79)

     FILE 'REGISTRY' ENTERED AT 16:03:46 ON 22 MAR 2005
                 E CARBON
                 E CARBON/CN
L81            1 SEA ABB=ON  PLU=ON  CARBON/CN

     FILE 'HCA' ENTERED AT 16:04:27 ON 22 MAR 2005
L82       293347 SEA ABB=ON  PLU=ON  L81
L83        16058 SEA ABB=ON  PLU=ON  (CARBON OR C OR L82)(2A)NANOTUB?
L84           76 SEA ABB=ON  PLU=ON  L83 AND L68
                 D QUE L78
L85        38880 SEA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR GAS?)(2A)(INFU
                 S? OR DIFFUS? OR SUFFUS?)
L86           16 SEA ABB=ON  PLU=ON  L84 AND L24
L87            2 SEA ABB=ON  PLU=ON  L84 AND L22
L88            0 SEA ABB=ON  PLU=ON  L84 AND L27
L89            1 SEA ABB=ON  PLU=ON  L84 AND L29
L90            7 SEA ABB=ON  PLU=ON  L84 AND L31
L91            5 SEA ABB=ON  PLU=ON  L84 AND L76
L92            2 SEA ABB=ON  PLU=ON  L84 AND (L78 OR L79 OR L85)
L93           27 SEA ABB=ON  PLU=ON  (L86 OR L87 OR L88 OR L89 OR L90 OR
                 L91 OR L92)
=> => d que l93
L16        15848 SEA FILE=HCA ABB=ON  PLU=ON  (CARBON OR C)(A)NANOTUB?
L22       701365 SEA FILE=HCA ABB=ON  PLU=ON  RADIAT?
L24        45063 SEA FILE=HCA ABB=ON  PLU=ON  (SINGL? OR ONE)(2A)(WALL?
                 OR LAYER?)
L27       313236 SEA FILE=HCA ABB=ON  PLU=ON  NONIONIZ? OR IONIZ?
L29        95265 SEA FILE=HCA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR
                 GAS?)(A)(BARRIER? OR PRESSUR? OR TRANSMI? OR ATMOSPHER?
                 OR ATM#)
L31      1766140 SEA FILE=HCA ABB=ON  PLU=ON  ULTRVIOLET? OR UV# OR XRAY?
                 OR X(W)RAY? OR (ELECTRON# OR E)(A)BEAM? OR VISIBL?(A)LIGH
                 T OR INFRARED? OR IR
L35            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9002-89-5/RN
L37            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9002-85-1/RN
L39            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  25067-34-9/RN
L40       183597 SEA FILE=REGISTRY ABB=ON  PLU=ON  POLYESTER/PCT
L42            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  25014-41-9/RN
L43        82135 SEA FILE=REGISTRY ABB=ON  PLU=ON  POLYAMIDE/PCT
L44        57463 SEA FILE=HCA ABB=ON  PLU=ON  L35
L45        45043 SEA FILE=HCA ABB=ON  PLU=ON  PVA OR POLYVINYL(W)ALCOHOL?
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                 OR ETHANOL(A)HOMOPOLYMER
L46       68914 SEA FILE=HCA ABB=ON  PLU=ON  L44 OR L45 OR PVA
L47        5953 SEA FILE=HCA ABB=ON  PLU=ON  L37
L48        2610 SEA FILE=HCA ABB=ON  PLU=ON  (VINYLIDENE(W)CHLORIDE)(A)(P
                 OLYMER OR HOMOPOLYMER)
L49        7812 SEA FILE=HCA ABB=ON  PLU=ON  L47 OR L48
L50          89 SEA FILE=HCA ABB=ON  PLU=ON  POLYALKYLENE(A)CARBONATE
L51        6527 SEA FILE=HCA ABB=ON  PLU=ON  L39
L52        5632 SEA FILE=HCA ABB=ON  PLU=ON  ((ETHYLENE(A)VINYL)(A)ALCOHO
                 L)(A)COPOLYMER#
L53        7037 SEA FILE=HCA ABB=ON  PLU=ON  L51 OR L52
L54      294965 SEA FILE=HCA ABB=ON  PLU=ON  L40
L55      307973 SEA FILE=HCA ABB=ON  PLU=ON  POLYESTER?
L56      447714 SEA FILE=HCA ABB=ON  PLU=ON  L54 OR L55
L57       15049 SEA FILE=HCA ABB=ON  PLU=ON  L42
L58       22295 SEA FILE=HCA ABB=ON  PLU=ON  POLYACRYLONITRILE?
L59       25971 SEA FILE=HCA ABB=ON  PLU=ON  L57 OR L58
L60      128236 SEA FILE=HCA ABB=ON  PLU=ON  L43
L61      155909 SEA FILE=HCA ABB=ON  PLU=ON  POLYAMIDE#
L62      220258 SEA FILE=HCA ABB=ON  PLU=ON  L60 OR L61
L63      680508 SEA FILE=HCA ABB=ON  PLU=ON  (L45 OR L46 OR L47 OR L48
                 OR L49 OR L50 OR L51 OR L52 OR L53 OR L54 OR L55 OR L56
                 OR L57 OR L58 OR L59 OR L60 OR L61 OR L62)
L68       63127 SEA FILE=HCA ABB=ON  PLU=ON  (PACK? OR WRAP? OR SHEATH?
                 OR COVER? OR ENVELOP? OR ENCASE? OR ENWRAP?)(2A)(FILM?
                 OR THINFILM? OR LAYER? OR OVERLAY? OR COAT?)
L69          75 SEA FILE=HCA ABB=ON  PLU=ON  L68 AND L16
L75      680508 SEA FILE=HCA ABB=ON  PLU=ON  L44 OR L63
L76           5 SEA FILE=HCA ABB=ON  PLU=ON  L75 AND L69
L78       34130 SEA FILE=HCA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR
                 GAS?)(2A)(PERMEA? OR PERVIOUS? OR IMPERVIOUS? OR
                 IMPERMEA? OR SEMIPERMEA? OR NONPERMEA?)
L79      176357 SEA FILE=HCA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR
                 GAS?)(2A)(BARRIER? OR PRESSUR? OR TRANSMI? OR ATMOSPHER?
                 OR ATM#)
L81           1 SEA FILE=REGISTRY ABB=ON  PLU=ON  CARBON/CN
L82      293347 SEA FILE=HCA ABB=ON  PLU=ON  L81
L83       16058 SEA FILE=HCA ABB=ON  PLU=ON  (CARBON OR C OR L82)(2A)NANO
                 TUB?
L84          76 SEA FILE=HCA ABB=ON  PLU=ON  L83 AND L68
L85       38880 SEA FILE=HCA ABB=ON  PLU=ON  (OXYGEN? OR O OR O2 OR
                 GAS?)(2A)(INFUS? OR DIFFUS? OR SUFFUS?)
L86          16 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND L24
L87           2 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND L22
L88           0 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND L27
L89           1 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND L29
L90           7 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND L31
L91           5 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND L76
L92           2 SEA FILE=HCA ABB=ON  PLU=ON  L84 AND (L78 OR L79 OR L85)

L93          27 SEA FILE=HCA ABB=ON  PLU=ON  (L86 OR L87 OR L88 OR L89
                 OR L90 OR L91 OR L92)
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=> d l93 1-27 cbib abs hitind

L93 ANSWER 1 OF 27 HCA COPYRIGHT 2005 ACS on STN
142:168489 Determination of phenolic compounds based on the tyrosinase-**single walled carbon nanotubes** sensor. Zhao, Qiang; Guan, Lunhui; Gu, Zhennan; Zhuang, Qiankun (College of Chemistry, Peking University, Beijing, 100871, Peop. Rep. China). Electroanalysis, 17(1), 85-88 (English) 2005. CODEN: ELANEU. ISSN: 1040-0397. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.

AB An amperometric sensor to phenolic compound was successfully constructed by immobilizing tyrosinase on the SWNTs modified glassy carbon (GC) electrode, which was **covered** with Nafion **film**. The sensitivity of the tyrosinase-SWNTs sensor to phenol was 155 μA/mM. The tyrosinase-SWNTs sensor also had good response to catechol, p-chlorophenol, and m-cresol. Furthermore, benzoic acid could be detected based on the inhibition to tyrosinase activity.

CC 80-6 (Organic Analytical Chemistry)
Section cross-reference(s): 72

ST phenol deriv detn **carbon nanotube** amperometric sensor

IT Electrodes
Sensors
(amperometric; determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT **Nanotubes**
(**carbon**; determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT Amperometry
(determination based on tyrosinase-**single walled carbon nanotubes** sensor)

IT Phenols, analysis
RL: ANT (Analyte); ANST (Analytical study)
(determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT Polyoxyalkylenes, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(fluorine- and sulfo-containing, ionomers, film; determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT Fluoropolymers, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(polyoxyalkylene-, sulfo-containing, ionomers, film; determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT Ionomers
RL: ARU (Analytical role, unclassified); DEV (Device component use);

ANST (Analytical study); USES (Uses)
(polyoxyalkylenes, fluorine- and sulfo-containing, film; determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT 65-85-0, Benzoic acid, analysis
RL: ANT (Analyte); ANST (Analytical study)
(determination based on tyrosinase-**single walled carbon nanotubes** sensor)

IT 106-48-9, p-Chlorophenol 108-39-4, m-Cresol, analysis 108-95-2, Phenol, analysis 120-80-9, Catechol, analysis
RL: ANT (Analyte); ANST (Analytical study)
(determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT 9002-10-2, Tyrosinase
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

IT **7440-44-0, Carbon,** analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**nanotubes;** determination of phenolic compds. based on tyrosinase-**single walled carbon nanotubes** sensor)

L93 ANSWER 2 OF 27 HCA COPYRIGHT 2005 ACS on STN

142:116188 Ductile functional coatings with good lubrication and corrosion resistance, their manufacture, and coated materials using them. Kuroyama, Shoji; Inagaki, Hiroshi (Takenaka Seisakusho K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2005007622 A2 20050113, 16 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2003-171590 20030617.

AB The coatings, useful for applying on bolts, nuts, etc., contain synthetic polymer solns. 100 (as solids), **carbon nanotubes** 2.3-40, and polar solvents 10-300 parts. Thus, dispersing 40 parts **single-layer carbon nanotubes** in 100 parts NMP and mixing with 100 parts resol phenolic resin gave a homogeneous coating, which was applied on a steel sheet and cured to show thickness 40-50 μm, pencil hardness (JIS K 5600-5-4) 9 H, Knoop hardness (JIS Z 2251) 165 Hk, and good interfacial adhesion. A pair of a bolt and a nut **covered** with the **coating** showed torque coefficient (JIS B 1186) 0.08.

IC ICM B32B027-20
ICS C09D005-00; C09D007-12; C09D201-00

CC 42-10 (Coatings, Inks, and Related Products)
Section cross-reference(s): 57

ST **carbon nanotube** thermosetting resin coating anticorrosion; resol phenolic resin **carbon nanotube** coating; NMP **carbon nanotube polyamide** imide coating

IT Coating materials
(anticorrosive; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Fluoropolymers, uses

RL: TEM (Technical or engineered material use); USES (Uses)
(aqueous matrixes or lubricant powders; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Lubricants
Polar solvents
(**carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Epoxy resins, uses
Polysiloxanes, uses
Polyurethanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT **Nanotubes**
(**carbon; carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Pigments, nonbiological
(coatings containing; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Polyimides, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**polyamide-; carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT **Polyamides**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(polyimide-; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Phenolic resins, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(resol; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT Alcohols, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(solvents; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT 1317-33-5, Molybdenum disulfide, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(lubricant; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT 7782-40-3, Diamond, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(nanopowder, lubricant; **carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT **7440-44-0, Carbon**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**nanotube; carbon nanotube**-containing anticorrosive coatings with good lubrication)

IT 78-93-3, Methyl ethyl ketone, uses 108-10-1, Methyl isobutyl ketone 127-19-5, Dimethylacetamide 872-50-4, N-Methyl-2-pyrrolidone, uses 7732-18-5, Water, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(solvent; **carbon nanotube**-containing

anticorrosive coatings with good lubrication)

L93 ANSWER 3 OF 27 HCA COPYRIGHT 2005 ACS on STN
141:424751 Flammability properties of PMMA-**single walled carbon nanotube** nanocomposites.
Kashiwagi, Takashi; Du, Fangming; Winey, Karen I.; Groth, Katrina M.; Shields, John R.; Harris, Richard H., Jr.; Douglas, Jack F. (Fire Research Division, NIST, BFRL, Gathersburg, MD, USA).
Polymeric Materials: Science and Engineering, 91, 90-91 (English) 2004. CODEN: PMSEDG. ISSN: 0743-0515. Publisher: American Chemical Society.

AB The effects of small quantities of **single-walled carbon nanotubes**(SWNT)in PMMA on the flammability properties of the nanocomposites were studied. A coagulation method was used to produce the PMMA/SWNT nanocomposites. The content of SWNT was varied up to 1 % mass fraction. The dispersion of nanotubes in the nanocomposites was characterized by taking optical micrographs of thin films. The formation of a continuous CNT network **layer covering** the entire surface without any cracks is critical for the lowest mass loss rate of the nanocomposites (lowest heat release rate). The addition of SWNT significantly reduces mass loss rate of PMMA, even for the contents <1 % mass fraction. The dispersion and concentration of the nanotubes in the nanocomposites determine whether the network layer is formed or not during the test.

CC 37-5 (Plastics Manufacture and Processing)

ST **carbon nanotube** polymethyl methacrylate nanocomposite flammability

IT **Nanotubes**
(**carbon**; flammability properties of poly(Me methacrylate)-**single-walled carbon nanotube** nanocomposites)

IT Flammability
Nanocomposites
(flammability properties of poly(Me methacrylate)-**single-walled carbon nanotube** nanocomposites)

IT **7440-44-0, Carbon,** uses
RL: MOA (Modifier or additive use); USES (Uses)
(**nanotubes**; flammability properties of poly(Me methacrylate)-**single-walled carbon nanotube** nanocomposites)

L93 ANSWER 4 OF 27 HCA COPYRIGHT 2005 ACS on STN
141:366865 Polymer/**Single-Walled Carbon Nanotube** Films Assembled via Donor-Acceptor Interactions and Their Use as Scaffolds for Silica Deposition. Rouse, Jason H.; Lillehei, Peter T.; Sanderson, Joel; Siochi, Emilie J. (National Institute of Aerospace, Hampton, VA, 23666, USA). Chemistry of Materials, 16(20), 3904-3910 (English) 2004. CODEN: CMATEX. ISSN: 0897-4756. Publisher: American Chemical Society.

AB A method of stepwise assembling thin polymer/**single-walled carbon nanotube** (SWCNT) films

using donor-acceptor interactions is demonstrated. When the affinity that amine groups have for nanotubes were utilized, films were formed by the sequential adsorption of polyethylenimine and polyallylamine followed by SWCNTs onto silicon substrates. In an effort to expand this methodol. to more thermally and oxidatively stable polymer systems, the ability of the basic nitrogen of the pyridine ring to adsorb SWCNTs was also investigated. These studies demonstrated that the nonsterically hindered, para-substituted pyridine in poly(4-vinylpyridine) (P4VP) also has an affinity for SWCNTs, thus enabling the stepwise formation of P4VP/SWCNT films. Microscopy of the films revealed that they were formed of single tubes and small bundles and that **film coverage** and thickness were uniform. The ability to use these films as scaffolds for the synthesis of novel hybrid structures is demonstrated by modifying the P4VP films using sol-gel chemical

CC 37-6 (Plastics Manufacture and Processing)

ST amino polymer **carbon nanotube** interaction film formation

IT **Nanotubes**
(**carbon**; use of amine-nanotube interactions for stepwise formation of polyamine/**carbon nanotube** films)

IT Polyamines
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(use of amine-nanotube interactions for stepwise formation of polyamine/**carbon nanotube** films)

IT **7440-44-0, Carbon,** uses
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES (Uses)
(**nanotubes**; use of amine-nanotube interactions for stepwise formation of polyamine/**carbon nanotube** films)

IT 7631-86-9, Silica, properties
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(preparation of silica/polyamine/**carbon nanotube** hybrid films)

IT 9002-98-6, Polyethylenimine 25232-41-1, Poly(4-vinylpyridine) 30551-89-4, Polyallylamine
RL: PEP (Physical, engineering or chemical process); POF (Polymer in formulation); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(use of amine-nanotube interactions for stepwise formation of polyamine/**carbon nanotube** films)

L93 ANSWER 5 OF 27 HCA COPYRIGHT 2005 ACS on STN

141:244725 Surface-conductive resin moldings with excellent surface smoothness and transparency. Aikawa, Yasushi; Yamaguchi, Hiroki (Toyobo Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 2004256712 A2

20040916, 14 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2003-50220 20030227.

AB The moldings, useful for electronic **packaging** materials, have **coating** layers containing conductive fiber fillers (A) 0.1-30, conductive resins (B) 0.05-89.9, and organic polymers (C) bearing ≥1 groups selected from carboxylic acid, sulfonic acid, phosphonic acid, phosphinic acid, and their salts as nonconductive matrixes 10-99.85% at weight ratio of B to A 0.5-5. Thus, a PET sheet coated with a composition containing **carbon nanotube** 5, Aqua Pass (sulfonate salt-containing polyaniline) 16, and di-Me isophthalate-di-Me 5-sodiosulfoisophthalate-di-Me terephthalate-ethylene glycol-neopentyl glycol copolymer 79 parts showed surface resistivity 3 + 108 Ω/.box., light transmittance 90%, haze 1.8%, and coating thickness 0.1 μm.

IC ICM C08L101-06
ICS C08J007-04; C08K007-06; C08L049-00; C08L065-00; C08L079-00; C08L101-12

CC 38-3 (Plastics Fabrication and Uses)
Section cross-reference(s): 42, 76

ST cond **carbon nanotube** coating resin molding; sulfonate polyaniline conductive resin molding transparency; antistaticity semiconductor transport tray coated PET

IT **Polyesters,** uses
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(Na sulfonate-containing, binder, coating layer; conductor-coated resin moldings with good surface smoothness and transparency for electronic packaging)

IT **Nanotubes**
(**carbon,** conductive filler, coating layer; conductor-coated resin moldings with good surface smoothness and transparency for electronic packaging)

IT Electric conductors
Electronic **packaging** materials
Transparent materials
(conductor-**coated** resin moldings with good surface smoothness and transparency for electronic packaging)

IT **81977-96-0P,** Dimethyl isophthalate-dimethyl 5-sodiosulfoisophthalate-dimethyl terephthalate-ethylene glycol-neopentyl glycol copolymer
RL: IMF (Industrial manufacture); POF (Polymer in formulation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(binder, coating layer; conductor-coated resin moldings with good surface smoothness and transparency for electronic packaging)

IT **7440-44-0, Carbon,** uses
RL: MOA (Modifier or additive use); TEM (Technical or engineered material use); USES (Uses)
(**nanotubes,** conductive filler, coating layer; conductor-coated resin moldings with good surface smoothness and transparency for electronic packaging)

IT **25038-59-9,** Poly(ethylene terephthalate), uses

RL: TEM (Technical or engineered material use); USES (Uses)
(substrate; conductor-coated resin moldings with good surface smoothness and transparency for electronic packaging)

L93 ANSWER 6 OF 27 HCA COPYRIGHT 2005 ACS on STN
141:227675 Manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition. Boskovic, Bojan (The Morgan Crucible Company Plc, UK). Brit. UK Pat. Appl. GB 2399092 A1 20040908, 22 pp. (English). CODEN: BAXXDU. APPLICATION: GB 2003-4826 20030303.

AB **Carbon nanotubes** and/or nanofibers are produced by catalytic decomposition of a gas feedstock on a catalyst which is impregnated and dispersed within a porous matrix. The porous matrix can be fibrous, a carbon based material, a ceramic based material, or polymeric. The nanotubes/nanofibers may be removed from the matrix by dissolving, reacting, melting or vaporizing. The **carbon nanotubes** are grown using ethylene and hydrogen as reactants. The products formed finds use as filters, heat spreaders, **packaging, gas diffusion layers** for fuel cells, or as electromagnetic shields.

IC ICM C01B031-02
ICS C23C016-26

CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 57, 67

ST **carbon nanotube** nanofiber chem vapor deposition manuf porous matrix; composite **carbon nanotube** nanofiber ceramic polymeric matrix

IT **Nanotubes**
(**carbon**; manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition)

IT Vapor deposition process
(chemical; manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition)

IT Carbon fibers, preparation
RL: CPS (Chemical process); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition)

IT Ceramics
(matrix; manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition)

IT 7439-89-6, Iron, uses
RL: CAT (Catalyst use); USES (Uses)
(manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition)

IT 74-85-1, Ethylene, reactions 1333-74-0, Hydrogen, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(manufacture of **carbon nanotubes** and/or nanofibers and composites by chemical vapor deposition)

IT 7782-42-5, Graphite, uses
RL: TEM (Technical or engineered material use); USES (Uses)

(matrix; manufacture of **carbon nanotubes** and/or
nanofibers and composites by chemical vapor deposition)

L93 ANSWER 7 OF 27 HCA COPYRIGHT 2005 ACS on STN
141:124411 Thermal and flammability properties of polypropylene/
carbon nanotube nanocomposites. Kashiwagi,
Takashi; Grulke, Eric; Hilding, Jenny; Groth, Katrina; Harris,
Richard; Butler, Kathryn; Shields, John; Kharchenko, Semen; Douglas,
Jack (Fire Research Division, NIST, Gaithersburg, MD, 20899-8665,
USA). Polymer, 45(12), 4227-4239 (English) 2004. CODEN: POLMAG.
ISSN: 0032-3861. Publisher: Elsevier Science Ltd..

AB The thermal and flammability properties of polypropylene/multi-
walled **carbon nanotube**, (PP/MWNT) nanocomposites
were measured with the MWNT content varied from 0.5 to 4% by mass.
Dispersion of MWNTs in these nanocomposites was characterized by SEM
and optical microscopy. Flammability properties were measured with
a cone calorimeter in air and a gasification device in a nitrogen
atmospheric A significant reduction in the peak heat release rate was
observed;
the greatest reduction was obtained with a MWNT content of 1% by mass.
Since the addition of carbon black powder to PP did not reduce the heat
release rate as much as with the PP/MWNT nanocomposites, the size
and shape of carbon particles appear to be important for effectively
reducing the flammability of PP. The **radiative** ignition
delay time of a nanocomposite having less than 2% by mass of MWNT
was shorter than that of PP due to an increase in the
radiation in-depth absorption coefficient by the addition of
carbon nanotubes. The effects of residual iron
particles and of defects in the MWNTs on the heat release rate of
the nanocomposite were not significant. The flame retardant
performance was achieved through the formation of a relatively
uniform network-structured floccule **layer covering**
the entire sample surface without any cracks or gaps. This layer
re-emitted much of the incident **radiation** back into the
gas phase from its hot surface and thus reduced the transmitted flux
to the receding PP layers below it, slowing the PP pyrolysis rate.
To gain insight into this phenomena, thermal conductivities of the
nanocomposites were measured as a function of temperature while the
thermal conductivity of the nanocomposite increases with an increase in
MWNT content, the effect being particularly large above 160
°C, this increase is not as dramatic as the increase in elec.
conductivity, however.

CC 37-5 (Plastics Manufacture and Processing)

ST thermal flammability polypropylene **carbon nanotube**
nanocomposite

IT **Nanotubes**
(**carbon**; thermal and flammability properties of
polypropylene-**carbon nanotube** nanocomposites)

IT Flammability
Nanocomposites
Polymer morphology
Thermal conductivity
(thermal and flammability properties of polypropylene-

carbon nanotube nanocomposites)
IT **7440-44-0, Carbon,** uses
RL: MOA (Modifier or additive use); USES (Uses)
(**nanotubes;** thermal and flammability properties of polypropylene-**carbon nanotube** nanocomposites)
IT 9003-07-0, Montell 6331
RL: POF (Polymer in formulation); PRP (Properties); USES (Uses)
(thermal and flammability properties of polypropylene-**carbon nanotube** nanocomposites)

L93 ANSWER 8 OF 27 HCA COPYRIGHT 2005 ACS on STN
140:429672 Influence of Ni-Co Catalyst Composition on Nitrogen Content in **Carbon Nanotubes.** Kudashov, A. G.; Okotrub, A. V.; Bulusheva, L. G.; Asanov, I. P.; Shubin, Yu. V.; Yudanov, N. F.; Yudanova, L. I.; Danilovich, V. S.; Abrosimov, O. G. (Nikolaev Institute of Inorganic Chemistry, SB RAS, Novosibirsk, 630090, Russia). Journal of Physical Chemistry B, 108(26), 9048-9053 (English) 2004. CODEN: JPCBFK. ISSN: 1520-6106. Publisher: American Chemical Society.
AB Nitrogen-containing **carbon nanotubes** were obtained by pyrolysis of acetonitrile (CH3CN) at 850 °C over catalytic nanoparticles formed by the thermal decomposition of Co and Ni bimaleates or their mutual solns. Structure and composition of synthesized samples were studied by electron microscopy, **X-ray** diffraction (XRD), and XPS. It is found that the yield of the nanotubes, the quality of the **layer packing,** and nitrogen content in the CNx nanotubes depend on the catalyst composition XPS of the N 1s spectra show that nitrogen atoms are in two different electronic states in the **carbon nanotubes.** According to quantum chemical calcns. these states can be ascribed to nitrogen atoms substituting for carbon atoms in the graphite network and pyridine-like atoms. It was shown that the nanotubes synthesized using catalyst with the ratio Ni/Co 1:1 contain the greatest proportion of pyridine-like nitrogen.
CC 67-2 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)
ST influence nickel cobalt catalyst compn nitrogen content **carbon nanotube**
IT **Nanotubes**
(**carbon;** influence of Ni-Co catalyst composition on nitrogen content in **carbon nanotubes**)
IT Catalysts
Thermal decomposition
(influence of Ni-Co catalyst composition on nitrogen content in **carbon nanotubes**)
IT 7440-02-0, Nickel, uses 7440-48-4, Cobalt, uses
RL: CAT (Catalyst use); PRP (Properties); USES (Uses)
(influence of Ni-Co catalyst composition on nitrogen content in **carbon nanotubes**)
IT 75-05-8, Acetonitrile, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(influence of Ni-Co catalyst composition on nitrogen content in

carbon nanotubes)
IT 7727-37-9, Nitrogen, properties
RL: PRP (Properties)
(influence of Ni-Co catalyst composition on nitrogen content in **carbon nanotubes**)
IT 7440-44-0P, Carbon, properties 154769-61-6P, Carbon nitride
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(influence of Ni-Co catalyst composition on nitrogen content in **carbon nanotubes**)

L93 ANSWER 9 OF 27 HCA COPYRIGHT 2005 ACS on STN
140:416350 Electronic device and its manufacturing method. Maruyama, Ryuichiro; Ata, Masafumi; Shiraishi, Masashi (Sony Corporation, Japan). PCT Int. Appl. WO 2004047183 A1 20040603, 43 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2003-JP14117 20031105. PRIORITY: JP 2002-335879 20021120.
AB A microminiaturized electronic device and its manufacturing method overcoming the defects of conventional electronic devices of carbon mols. and having performance superior to those of conventional ones. A multilayer **carbon nanotube** having an outer semiconductive **carbon nanotube** layer and an inner metallic **carbon nanotube layer** partly **covered** with the outer semiconductive **carbon nanotube** layer is used. Source and drain electrodes of metal are in contact with both ends of the semiconductive **carbon nanotube**, resp. A gate electrode of metal is in contact with the metallic **carbon nanotube** layer. A gate insulating layer is formed in the space between the semiconductive and metallic **carbon nanotube** layers. Thus, an insulated-gate field-effect transistor is constructed. The multilayer **carbon nanotube** is formed into a desired shape of two **carbon nanotube layers** the outer **one** of which is a semiconductive **carbon nanotube** layer and the inner one of which is a metallic **carbon nanotube** layer. These **carbon nanotube** layers are selected from **carbon nanotube** layers of a multilayer **carbon nanotube**.
IC ICM H01L029-786
ICS B82B001-00; B82B003-00; H01L029-06
CC 76-3 (Electric Phenomena)
ST **carbon nanotube** insulated gate field effect transistor lead

IT Etching
Interconnections, electric
Tunneling devices
(**carbon nanotube** insulated-gate field-effect
transistor)
IT Field effect transistors
(insulated-gate; **carbon nanotube**
insulated-gate field-effect transistor)
IT Micromachines
(microelectromech. devices; **carbon nanotube**
insulated-gate field-effect transistor)
IT **7440-44-0, Carbon,** processes
RL: DEV (Device component use); EPR (Engineering process); PEP
(Physical, engineering or chemical process); PROC (Process); USES
(Uses)
(**nanotubes; carbon nanotube**
insulated-gate field-effect transistor)

L93 ANSWER 10 OF 27 HCA COPYRIGHT 2005 ACS on STN
140:380991 Titanium coverage on a **single-wall
carbon nanotube**: molecular dynamics simulations.
Oymak, Huseyin; Erkoc, Sakir (Department of Physics, Middle East
Technical University, Ankara, 06531, Turk.). Chemical Physics,
300(1-3), 277-283 (English) 2004. CODEN: CMPHC2. ISSN: 0301-0104.
Publisher: Elsevier Science B.V..
AB The min. energy structures of Ti covered (8,0) **single-
wall carbon nanotube** (SWNT) were
investigated theor. Using available exptl. data and the results of
d. functional theory calcns., we first parametrized a reliable
empirical many-body potential energy function (PEF) for the
carbon-titanium system. The PEF used in the calcns. includes two-
and three-body atomic interactions. Then performing mol. dynamics
simulations at 1 and 300 K, we obtained the min.-energy
configurations for Ti covered (8,0)-SWNT. The configurations
reported here include low and high coverage of Ti on nanotubes.
One layer of Ti did not distort the nanotube
significantly, whereas two-**layer coverage** showed
an interesting feature: the second layer of Ti pushed the first
layer inside the wall of nanotube, but the general shape of the
nanotube was not affected so much.
CC 65-5 (General Physical Chemistry)
Section cross-reference(s): 66
ST titanium coverage **carbon nanotube** geometry mol
dynamics
IT **Nanotubes**
(**carbon**; titanium coverage of **single-
wall carbon nanotube** studied by mol.
dynamics simulations)
IT Bond length
Cluster structure
Many-body potential
(titanium coverage of **single-wall
carbon nanotube** studied by mol. dynamics

simulations)
IT 7440-44-0D, Carbon, compound with titanium
RL: PRP (Properties)
(nanotubes; titanium coverage of **single-wall carbon nanotube** studied by mol. dynamics simulations)
IT 7440-32-6D, Titanium, compound with **carbon nanotube**
RL: PRP (Properties)
(titanium coverage of **single-wall carbon nanotube** studied by mol. dynamics simulations)

L93 ANSWER 11 OF 27 HCA COPYRIGHT 2005 ACS on STN
140:237937 Catalyst support substrate and growing of **carbon nanotube** using same, and transistor using **carbon nanotubes**.. Hongo, Hiroo (NEC Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2004067413 A2 20040304, 25 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-226020 20020802.
AB The catalyst support substrate is used for growing **carbon nanotube** by chemical vapor deposition (CVD), and the substrate has a main surface which includes: (a) 1st region containing **carbon nanotube** CVD catalyst, and (b) 2nd region containing a metal or its compound The above stated **carbon nanotube** is **single layer carbon nanotube**. The above stated **carbon nanotube** CVD catalyst is ≥ 1 of Fe, Ni, Co, Ru, Rh, Pd, Os, **Ir**, Pt, La, Y, Mo and Mn, or their compds. The above stated metal or its compound in the 2nd region is: ≥ 1 of Al, Mo, Ti, Ta, Cr, Cu, Mn. Mg, Zr, Hf, W, Ru, Rh, Zn and Sn, or their compds. A catalyst support film and a catalyst **film** , which **covers** a part of the catalyst support film, are formed on the main surface of the catalyst support substrate in order. The surface of the catalyst support substrate contains ≥ 1 of Al natural oxidation film, boehmite, α-alumina, γ-alumina, δ-alumina and θ-alumina. The transistor includes a substrate, a catalyst-containing film arranged on the main surface of the substrate, **carbon nanotube** extended from the catalyst-containing film in horizontal direction, a 1st electrode connected with the catalyst-containing film side of the **carbon nanotube**, a 2nd electrode connected with the other side of the **carbon nanotube**, and a gate electrode for applying a voltage on the **carbon nanotube**.
IC ICM C01B031-02
ICS C23C014-14; C23C016-06
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 76
ST catalyst support substrate **carbon nanotube** growth transistor
IT **Nanotubes**
(**carbon**; catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)

IT Catalysts
Field effect transistors
Transistors
(catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT Vapor deposition process
(chemical; catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT Catalyst supports
(substrate; catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT 24623-77-6, Aluminum hydroxide oxide (Al(OH)O)
RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)
(boehmite-type; catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT 1344-28-1, Alumina, uses
RL: DEV (Device component use); NUU (Other use, unclassified); USES (Uses)
(catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT 7429-90-5, Aluminum, uses 7439-95-4, Magnesium, uses 7440-25-7, Tantalum, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-50-8, Copper, uses 7440-58-6, Hafnium, uses 7440-66-6, Zinc, uses 7440-67-7, Zirconium, uses
RL: NUU (Other use, unclassified); USES (Uses)
(catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-91-0, Lanthanum, uses 7440-02-0, Nickel, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-48-4, Cobalt, uses 7440-65-5, Yttrium, uses
RL: CAT (Catalyst use); USES (Uses)
(catalyst; catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT 7439-96-5, Manganese, uses 7439-98-7, Molybdenum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses
RL: CAT (Catalyst use); NUU (Other use, unclassified); USES (Uses)
(catalyst; catalyst support substrate and growing of **carbon nanotube** using same and transistor using **carbon nanotubes**)
IT **7440-44-0P, Carbon,** preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(**nanotubes;** catalyst support substrate and growing of **carbon nanotube** using same and transistor using

carbon nanotubes)

L93 ANSWER 12 OF 27 HCA COPYRIGHT 2005 ACS on STN
140:169746 Manufacture of deformation-free photocurable resin moldings for dental fillings. Okuma, Kazuo (Japan). Jpn. Kokai Tokkyo Koho JP 2004049877 A2 20040219, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-344163 20021127. PRIORITY: JP 2002-158431 20020531.

AB Title moldings are manufactured by 2-step irradiation of 2-layered photocurable resin compns. so that the under layer is first cured, then the **covering layer** is cured. Thus, a 3-layered acrylate resin composition containing different benzophenone-type dyes in each layer was irradiated with YAG laser at 532 nm, LED laser at 470 nm, and YAG laser at 355 nm, each for 1 min to cure from inside of the composition A nonsticky molding was manufactured

IC ICM A61C013-15
ICS A61K006-08

CC 63-7 (Pharmaceuticals)
Section cross-reference(s): 38

IT **Nanotubes**
(**carbon**, fillers; multistep irradiation of layered photocurable compns. for curing from inside in manufacture of deformation-free dental fillings)

IT Electroluminescent devices
Laser **radiation**
(multistep irradiation of layered photocurable compns. for curing from inside in manufacture of deformation-free dental fillings)

IT Fillers
(**visible light**-absorbing; multistep irradiation of layered photocurable compns. for curing from inside in manufacture of deformation-free dental fillings)

IT 7440-44-0, **Carbon**, biological studies
RL: MOA (Modifier or additive use); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(**nanotubes**, fillers; multistep irradiation of layered photocurable compns. for curing from inside in manufacture of deformation-free dental fillings)

L93 ANSWER 13 OF 27 HCA COPYRIGHT 2005 ACS on STN
139:396646 Laminated packaging materials and their sealing method. Frisk, Peter; Kobayashi, Norio; Omoto, Yoshio (Nihon Tetra Pack K. K., Japan). Jpn. Kokai Tokkyo Koho JP 2003334898 A2 20031125, 3 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-147039 20020522.

AB Title materials comprise (A) substrates and (B) sealable polymer layers containing near **IR** absorbers dispersed in the polymers. The materials are sealed by irradiating the polymer layers with laser light to heat. In the method, heat-sealed positions and conditions are easily controlled. Thus, LDPE and **C nanotube** were kneaded, extruded on a substrate, and irradiated with laser light to give a heat-sealed test piece at a desired part.

IC ICM B32B027-18
ICS B65D065-40

CC 38-3 (Plastics Fabrication and Uses)
ST heat sealable packaging material near **IR** absorber;
carbon nanotube IR absorber packaging
material
IT Optical materials
(**IR** absorbers; heat-sealable laminated packaging
materials containing near **IR** absorbers)
IT **IR** materials
(absorbers; heat-sealable laminated packaging materials containing
near **IR** absorbers)
IT **Nanotubes**
(**carbon**, near **IR** absorbers; heat-sealable
laminated packaging materials containing near **IR** absorbers)
IT Laminated plastics, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(heat-sealable laminated packaging materials containing near
IR absorbers)
IT **Packaging** materials
(laminated **films**, heat-sealable; heat-sealable
laminated packaging materials containing near **IR** absorbers)
IT Fullerenes
RL: MOA (Modifier or additive use); TEM (Technical or engineered
material use); USES (Uses)
(near **IR** absorbers; heat-sealable laminated packaging
materials containing near **IR** absorbers)
IT Pigments, nonbiological
(organic, transparent, near **IR** absorbers; heat-sealable
laminated packaging materials containing near **IR** absorbers)
IT Plastics, uses
RL: POF (Polymer in formulation); TEM (Technical or engineered
material use); USES (Uses)
(thermosetting; heat-sealable laminated packaging materials
containing near **IR** absorbers)
IT 9002-88-4, LDPE
RL: POF (Polymer in formulation); TEM (Technical or engineered
material use); USES (Uses)
(heat-sealable laminated packaging materials containing near
IR absorbers)
IT **7440-44-0**, **Carbon**, uses
RL: MOA (Modifier or additive use); TEM (Technical or engineered
material use); USES (Uses)
(**nanotubes**, near **IR** absorbers; heat-sealable
laminated packaging materials containing near **IR** absorbers)

L93 ANSWER 14 OF 27 HCA COPYRIGHT 2005 ACS on STN
139:298171 Facile deposition of [60]fullerene and **carbon**
nanotubes on ITO electrode by electrochemical oxidative
polymerization of ethylenedioxythiophene. Hatano, Tsukasa; Bae,
Ah-Hyun; Sugiyasu, Kazunori; Fujita, Norifumi; Takeuchi, Masayuki;
Ikeda, Asushi; Shinkai, Seiji (Department of Chemistry and
Biochemistry, Graduate School of Engineering, Kyushu University,
Fukuoka, 812-8581, Japan). Organic & Biomolecular Chemistry, 1(13),
2343-2347 (English) 2003. CODEN: OBCRAK. ISSN: 1477-0520.

Publisher: Royal Society of Chemistry.

AB [60]Fullerene encapsulated in p-sulfonatocalix[8]arene and **single-walled C nanotubes** (SWNTs) solubilized by Na dodecylsulfate can be readily deposited on the ITO electrode by electrochem. oxidative polymerization of ethylenedioxythiophene (EDOT) without chemical modification of these C clusters. The driving force for the deposition is an electrostatic interaction between the anionic complexes and the cationic charges of poly(EDOT) formed in the oxidative polymerization process. The surface morphol. was thoroughly characterized by scanning electron micrograph: the [60]fullerene/poly(EDOT) **film** is **covered** by nano-particles with 20-100 nm diams. whereas the SWNTs/poly(EDOT) **film** is **covered** by nanorods with several μm length and .apprx.100 nm diameter The anionic complexes act as nuclei for the polymer growth in the oxidation polymerization When these modified ITO electrodes were photoirradiated, the appearance of a photocurrent wave was observed The action spectra showed that the photoexcited energy of [60]fullerene or SWNTs is efficiently collected by the electroconductive poly(EDOT) film and transferred to the ITO electrode.

CC 72-2 (Electrochemistry)
Section cross-reference(s): 35, 74

ST electrochem oxidative polymn ethylenedioxythiophene fullerene complex ITO electrode; **carbon nanotube** SDS deposition ITO electrochem oxidative polymn ethylenedioxythiophene

IT **Nanotubes**
(**carbon**; facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT Polymerization
(electrochem., oxidative; facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT Cyclic voltammetry
Photocurrent
(facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT Photoelectrochemistry
(photoelectrochem. of methylviologen in presence of fullerene complex or **carbon nanotubes** on ITO electrode)

IT 126213-50-1, 3,4-Ethylenedioxythiophene
RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT 151-21-3, Sodium dodecylsulfate, uses
RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process); USES

(Uses)
(facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT 126213-51-2P, PEDOT
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT 609313-57-7
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT 7440-44-0, Carbon, uses 50926-11-9, Indium tin oxide
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(facile deposition of fullerene complex and **carbon nanotubes** on indium tin oxide electrode by electrochem. oxidative polymerization of ethylenedioxythiophene)

IT 1910-42-5, Methylviologen
RL: CPS (Chemical process); NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(photoelectrochem. of methylviologen in presence of fullerene complex or **carbon nanotubes** on ITO electrode)

L93 ANSWER 15 OF 27 HCA COPYRIGHT 2005 ACS on STN
139:254188 Fabrication of the MgCxCo3 ternary phase encapsulated in carbon nanoflasks. Rana, Rohit K.; Xu, Xiao N.; Yeshurun, Yosef; Gedanken, Aharon (Department of Chemistry, Bar-Ilan University, Ramat-Gan, 52900, Israel). Advanced Materials (Weinheim, Germany), 15(11), 926-930 (English) 2003. CODEN: ADVMEW. ISSN: 0935-9648. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.

AB Carbon nanoflasks encapsulating the MgCxCo3 ternary phase were synthesized. Structural and compositional analyses of the encapsulated particles revealed that the MgCxCo3 particles are crystalline and well protected by the **covering** graphene **layers**. The encapsulated particles exhibit mixed superparamagnetic and ferromagnetic behavior.

CC 77-8 (Magnetic Phenomena)
Section cross-reference(s): 78

IT **Nanotubes**
(**carbon**, nanoflasks; fabrication and ferromagnetism and superparamagnetism of MgCxCo3 ternary phase encapsulated in carbon nanoflasks)

IT Electron diffraction

Encapsulation
Ferromagnetism
Magnetization
Nanoparticles
Transmission electron microscopy
X-ray diffraction
(fabrication and ferromagnetism and superparamagnetism of MgCxCo3 ternary phase encapsulated in carbon nanoflasks)

IT **7440-44-0P**, **Carbon**, properties
RL: PNU (Preparation, unclassified); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**nanotubes**, nanoflasks; fabrication and ferromagnetism and superparamagnetism of MgCxCo3 ternary phase encapsulated in carbon nanoflasks)

L93 ANSWER 16 OF 27 HCA COPYRIGHT 2005 ACS on STN

139:55492 Production method for composite material for fuel cell separator molding. Kitade, Taku; Suzuki, Mitsuo (Mitsubishi Chemical Corporation, Japan). Eur. Pat. Appl. EP 1324411 A2 20030702, 21 pp. DESIGNATED STATES: R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, SK. (English). CODEN: EPXXDW. APPLICATION: EP 2002-28789 20021223. PRIORITY: JP 2001-394448 20011226.

AB The invention relates to a composite material for fuel cell separator molding, which comprises a carbonaceous powder dispersed in a matrix, wherein the matrix comprises a resin **coat cover** for **coating** the carbonaceous powder and a resin reinforcing phase having higher heat resistance than a resin which forms the resin **coat cover**; a production method of the composite material; a fuel cell separator which uses the composite material; and a production method thereof.

IC ICM H01M008-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

IT **Nanotubes**
(**carbon**; production method for composite material for fuel cell separator molding)

IT Carbon fibers, uses
RL: DEV (Device component use); USES (Uses)
(**polyacrylonitrile**-based; production method for composite material for fuel cell separator molding)

IT Polyimides, uses
RL: DEV (Device component use); USES (Uses)
(**polyamide-**; production method for composite material for fuel cell separator molding)

IT **Polyamides**, uses
RL: DEV (Device component use); USES (Uses)
(polyimide-; production method for composite material for fuel cell separator molding)

IT Carbonaceous materials (technological products)
Fluoropolymers, uses
Polyamides, uses

Polycarbonates, uses
Polyimides, uses
Polysulfones, uses
RL: DEV (Device component use); USES (Uses)
(production method for composite material for fuel cell separator molding)

IT **7440-44-0, Carbon,** uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**nanotubes**; production method for composite material for fuel cell separator molding)

IT 7782-42-5, Graphite, uses **9020-32-0** 9020-73-9, Polyethylene naphthalate 9041-80-9, Polyphenylene ether
RL: DEV (Device component use); USES (Uses)
(production method for composite material for fuel cell separator molding)

L93 ANSWER 17 OF 27 HCA COPYRIGHT 2005 ACS on STN
138:112948 Electrostatic Assembly of Polymer/**Single Walled Carbon Nanotube** Multilayer Films.
Rouse, Jason H.; Lillehei, Peter T. (ICASE Advanced Materials and Processing Branch, NASA-Langley Research Center, Hampton, VA, 23681, USA). Nano Letters, 3(1), 59-62 (English) 2003. CODEN: NALEFD. ISSN: 1530-6984. Publisher: American Chemical Society.

AB Polymer/**carbon nanotube** films have been formed by the alternate adsorption of the polyelectrolyte poly(diallyldimethylammonium chloride) and **single walled carbon nanotubes** (SWNT) onto substrates. Atomic force and scanning electron microscopies indicated that the adsorbed SWNTs were mostly in the form of 5-10 nm bundles and that uniform substrate coverage occurred. Absorbance spectrophotometry (**UV**-vis-NIR) confirmed that the adsorption technique resulted in uniform film growth. Characterization of the adsorbed SWNTs by **X-ray** photoelectron, Raman, and **UV**-vis-NIR spectroscopies suggested that they have a core of well ordered nanotubes **covered** by a **layer** of oxidized **carbon nanotubes.**

CC 66-3 (Surface Chemistry and Colloids)

ST electrostatic assembly polymer **single walled carbon nanotube** multilayer film

IT Surface structure
(AFM and SEM images; polymer-**carbon nanotube** multilayer film studied using)

IT **Nanotubes**
(**carbon, single walled;** electrostatic assembly of polymer-**carbon nanotube** multilayer film)

IT Self-assembly
(layer-by-layer; electrostatic assembly of polymer-**carbon nanotube** multilayer film)

IT Films
(multilayer; electrostatic assembly of polymer-**carbon nanotube** multilayer film)

IT **IR** absorption
(near-**IR**; polymer-**carbon nanotube** multilayer film studied using)
IT Raman spectra
UV and visible spectra
X-ray photoelectron spectra
(polymer-**carbon nanotube** multilayer film studied using)
IT **7440-44-0, Carbon,** properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(**nanotubes, single walled;** electrostatic assembly of polymer-**carbon nanotube** multilayer film)
IT 26062-79-3, Poly(diallyldimethylammonium chloride)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(polyelectrolyte; electrostatic assembly of polymer-**carbon nanotube** multilayer film)
IT 7440-21-3D, Silicon, hydroxy bearing
RL: NUU (Other use, unclassified); USES (Uses)
(wafer, substrate; electrostatic assembly of polymer-**carbon nanotube** multilayer film)

L93 ANSWER 18 OF 27 HCA COPYRIGHT 2005 ACS on STN
137:378166 Nanoditches Fabricated Using a **Carbon Nanotube** as a Contact Mask. Xu, Tao; Metzger, Robert M. (Department of Chemistry, Laboratory for Molecular Electronics, University of Alabama, Tuscaloosa, AL, 35487-0336, USA). Nano Letters, 2(10), 1061-1065 (English) 2002. CODEN: NALEFD. ISSN: 1530-6984. Publisher: American Chemical Society.
AB **Single-walled carbon nanotubes** (SWCNTs) and multiple-walled nanotubes (MWCNTs) were used as contact masks to create nanoditches within a thin **layer** of oxide-**covered** Ti. The nanotubes buried in the Ti film can be removed by ultrasonication, leaving the Ti layer with well-formed uniform ditches up to several μm in length and as narrow as 10 nm in width. The width of the nanoditches is determined by the diameter of the departing nanotube. The technique presented may help to build electrode-to-span mols. or may furnish a template to fabricate nanowires of various materials.
CC 76-3 (Electric Phenomena)
ST **carbon nanotube** nanotrench fabrication field effect transistor
IT **Nanotubes**
(**carbon;** nanoditches fabricated using a **carbon nanotube** as a contact mask in field effect transistor fabrication)
IT Photomasks (lithographic masks)
(contact; nanoditches fabricated using a **carbon nanotube** as a contact mask in field effect transistor fabrication)
IT Field effect transistors

Molecular electronics
Scanning electron microscopy
Semiconductor device fabrication
(nanoditches fabricated using a **carbon nanotube** as a contact mask in field effect transistor fabrication)
IT Oxides (inorganic), uses
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(nanoditches fabricated using a **carbon nanotube** as a contact mask in field effect transistor fabrication)
IT 7440-21-3P, Silicon, uses 7440-32-6P, Titanium, uses 7631-86-9P, Silica, uses
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(nanoditches fabricated using a **carbon nanotube** as a contact mask in field effect transistor fabrication)
IT **7440-44-0P, Carbon,** uses
RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(**nanotubes;** nanoditches fabricated using a **carbon nanotube** as a contact mask in field effect transistor fabrication)

L93 ANSWER 19 OF 27 HCA COPYRIGHT 2005 ACS on STN
137:283040 Starched **carbon nanotubes.** Star, Alexander; Steuerman, David W.; Heath, James R.; Stoddart, J. Fraser (Department of Chemistry and Biochemistry, University of California, Los Angeles, Los Angeles, CA, 90095-1569, USA). Angewandte Chemie, International Edition, 41(14), 2508-2512 (English) 2002. CODEN: ACIEF5. ISSN: 1433-7851. Publisher: Wiley-VCH Verlag GmbH.
AB Common or garden starch can render **single-walled carbon nanotubes** (SWNTs) readily soluble in water. The secret is to preorganize the linear amylose component in the starch into a helix with iodine prior to bringing the SWNTs on the scene. The SWNTs displace the iodine mols. in a "pea-shooting" type of mechanism. After some phys. cajoling of the aqueous solution containing the starch, SWNT complex, a fine "bucky paper" is formed. Spitting in the aqueous solution, followed by sitting around for a few hours, also enables equally fine "bucky paper" to be harvested.
CC 57-8 (Ceramics)
Section cross-reference(s): 33
ST **carbon nanotube** water soly starch treatment self assembly
IT **Nanotubes**
(**carbon; coating** or **wrapping** of **carbon nanotubes** in starch-iodine complex to enable aqueous dispersion for preparation of bucky paper)
IT Self-assembly
(**coating** or **wrapping** of **carbon nanotubes** in starch-iodine complex to enable aqueous dispersion for preparation of bucky paper)
IT 9005-25-8, Starch, uses 9005-82-7, Amylose

RL: NUU (Other use, unclassified); USES (Uses)
(**coating** or **wrapping** of **carbon nanotubes** in starch-iodine complex to enable aqueous dispersion for preparation of bucky paper)

IT **7440-44-0, Carbon,** processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(**nanotubes; coating** or **wrapping** of **carbon nanotubes** in starch-iodine complex to enable aqueous dispersion for preparation of bucky paper)

IT 7553-56-2, Iodine, uses
RL: NUU (Other use, unclassified); USES (Uses)
(preorganizing agent; **coating** or **wrapping** of **carbon nanotubes** in starch-iodine complex to enable aqueous dispersion for preparation of bucky paper)

L93 ANSWER 20 OF 27 HCA COPYRIGHT 2005 ACS on STN

136:372249 Flat-arranged electrochemical cell unit equipped with hydrogen-absorbing anode. Tanaka, Koichi (Sony Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002141080 A2 20020517, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-337626 20001106.

AB The title unit is equipped with a plurality of laminated unit cells serially connected in the vertical direction to lamination, where each unit cell comprises (1) a H-absorbing anode having parallel-facing 2 surfaces (X) along the laminating direction, (2) a proton-conducting **layer covering** whole surfaces of (1), and (3) an O cathode **layer** placed **one** side of X by contacting with (2). Preferably, (1) contains H-absorbing body selected from **C**-type fullerenes, **nanotubes**, and nanofibers, and metal hydrides. The unit, especially suitable for polymer-electrolyte fuel cells, is prevented from mixing of a H gas and an O gas to show flexibility of design and is not needed to supply the H gas continuously.

IC ICM H01M008-02
ICS H01M004-86; H01M004-96; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT **Nanotubes**
(**carbon,** anodes; flat-arranged electrochem. cell unit equipped with hydrogen-absorbing anode coated with proton conductor)

IT **7440-44-0, Carbon,** uses
RL: TEM (Technical or engineered material use); USES (Uses)
(**nanotubes,** anodes; flat-arranged electrochem. cell unit equipped with hydrogen-absorbing anode coated with proton conductor)

L93 ANSWER 21 OF 27 HCA COPYRIGHT 2005 ACS on STN

136:202656 Polymer-wrapped **single wall carbon nanotubes.** Smalley, Richard E.; Colbert, Daniel T.; Smith, Ken A.; O'Connell, Michael (William Marsh Rice University, USA). PCT Int. Appl. WO 2002016257 A2 20020228, 39 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI,

GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2001-US26308 20010823. PRIORITY: US 2000-PV227604 20000824; US 2001-PV268269 20010213.

AB The present invention relates to new compns. of matter and articles of manufacture comprising SWNTs as nanometer scale conducting rods dispersed in an elec.-insulating matrix. These compns. of matter have novel and useful elec., mech., and chemical properties including applications in antennas, electromagnetic and electro-optic devices, and high-toughness materials. Other compns. of matter and articles of manufacture are disclosed, including polymer-**coated** and polymer **wrapped single-wall** nanotubes (SWNTs), small ropes of polymer-**coated** and polymer-**wrapped** SWNTs and materials comprising same. The composition provides one embodiment of the SWNT conducting-rod composite mentioned above, and also enables creation of high-concentration suspensions of SWNTs and compatibilization of SWNTs with polymeric matrixes in composite materials. This solubilization and compatibilization, in turn, enables chemical manipulation of SWNT and production of composite fibers, films, and solids comprising SWNTs.

IC ICM C01B

CC 49-1 (Industrial Inorganic Chemicals)

ST polymer wrapped **single wall carbon nanotube** dielec material

IT **Nanotubes**
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(**carbon**; polymer-wrapped **single wall carbon nanotubes** as dielec. materials)

IT Electric insulators
(polymer-wrapped **single wall carbon nanotubes** as dielec. materials)

IT Epoxy resins, uses
Phenolic resins, uses
Polyamides, uses
Polycarbonates, uses
Polyesters, uses
Polyimides, uses
Polyoxyalkylenes, uses
RL: MOA (Modifier or additive use); USES (Uses)
(polymer-wrapped **single wall carbon nanotubes** as dielec. materials)

IT Albumins, uses
RL: MOA (Modifier or additive use); USES (Uses)
(serum, bovine; polymer-wrapped **single wall carbon nanotubes** as dielec. materials)

IT 9002-88-4, Polyethylene **9002-89-5, Polyvinyl alcohol** 9003-07-0, Polypropylene 9003-39-8, Polyvinyl pyrrolidone 9003-53-6, Polystyrene 9004-54-0, Dextran, uses

9010-88-2, Methyl methacrylate-ethyl acrylate polymer 9011-14-7, Poly(methylmethacrylate) 9042-14-2, Dextran sulfate 25086-89-9 25191-25-7, Polyvinyl sulfate 25322-68-3, Polyethylene glycol 28062-44-4 30551-89-4, Polyallylamine 30581-59-0 50851-57-5 401630-55-5
RL: MOA (Modifier or additive use); USES (Uses)
(polymer-wrapped **single wall carbon nanotubes** as dielec. materials)

L93 ANSWER 22 OF 27 HCA COPYRIGHT 2005 ACS on STN
133:267550 In situ fabrication of **carbon nanotube**/nylon 6 composites. Jia, Zhijie; Wang, Zhengyuan; Xu, Cailu; Liang, Ji; Wei, Bingqing; Wu, Dehai; Zhang, Zhengmin (Dep. Mechanical Eng., Tsinghua Univ., Beijing, 100084, Peop. Rep. China). Qinghua Daxue Xuebao, Ziran Kexueban, 40(4), 14-16 (Chinese) 2000. CODEN: QDXKE8. ISSN: 1000-0054. Publisher: Qinghua Daxue Chubanshe.

AB Mech. properties of nylon-6 (PA6) were improved by making a composite **carbon nanotubes** (CNT) with PA6. An in situ process was used to fabricate CNT/PA6 composites that have a strong CNT/PA6 interface linked by C-O-C chemical bonds between the CNT and the matrix with a homogeneous distribution of CNTs in the PA6 matrix. The composites have a higher tensile strength with good toughness and elongation. Exptl. results show that the fracture interface is not at the CNT/PA6 interface as with other fiber reinforced polymer composites, but at the interface between the PA6 **layer wrapping** the CNT and the PA6 matrix.

CC 37-6 (Plastics Manufacture and Processing)
Section cross-reference(s): 57

ST **carbon nanotube** reinforced nylon composite mech property; microstructure fracture interface **carbon nanotube** nylon composite

IT Nanocomposites
(In situ fabrication of **carbon nanotube**/nylon-6 composites)

IT **Nanotubes**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(**carbon**, reinforcing phase; In situ fabrication of **carbon nanotube**/nylon-6 composites)

IT **Polyamides**, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composite matrix; In situ fabrication of **carbon nanotube**/nylon-6 composites)

IT Fracture (materials)
(interfacial; of **carbon nanotube**/nylon-6 composites)

IT Bond
Elongation, mechanical
Impact strength

Microstructure
Tensile strength
(of **carbon nanotube**/nylon-6 composites)
IT **25038-54-4**, Nylon-6, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composite matrix; In situ fabrication of **carbon nanotube**/nylon-6 composites)

L93 ANSWER 23 OF 27 HCA COPYRIGHT 2005 ACS on STN
131:292466 Electrochemical characterization of films of **single-walled carbon nanotubes** and their possible application in supercapacitors. Liu, Chong-Yang; Bard, Allen J.; Wudl, Fred; Weitz, Iris; Heath, James R. (Department of Chemistry and Biochemistry, The University of Texas at Austin, Austin, TX, 78712, USA). Electrochemical and Solid-State Letters, 2(11), 577-578 (English) 1999. CODEN: ESLEF6. ISSN: 1099-0062. Publisher: Electrochemical Society.
AB Films of **single-wall carbon nanotubes** (SWCNTs) were cast from suspensions in several solvents on the surface of a Pt or Au electrode. Cyclic voltammetry of the films in MeCN did not show well-resolved waves (as distinct from films of C60 prepared in a similar manner). However, the increase in the effective capacitance of the electrode with a SWCNT film at 0.5 V vs. an AgQRE was 283 F/g, which is about twice that of carbon electrodes in nonaq. solvents.
CC 72-2 (Electrochemistry)
ST films **single walled carbon nanotubes** electrochem characterization
IT **Nanotubes**
RL: PRP (Properties)
(**carbon**; electrochem. characterization of films of **single-walled carbon nanotubes**)
IT Capacitors
(films of **single-walled carbon nanotubes** possible application as super capacitors)
IT Electric capacitance
(of Pt electrode **covered** with **films** of **single-walled carbon nanotubes**)
IT Cyclic voltammetry
(of films of **single-walled carbon nanotubes** and C60 fullerene on Pt in acetonitrile containing TBAPF6)
IT 75-05-8, Acetonitrile, uses 3109-63-5, Tetrabutylammonium hexafluorophosphate
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(cyclic voltammetry of films of **single-walled carbon nanotubes** and C60 fullerene on Pt in acetonitrile containing TBAPF6)

L93 ANSWER 24 OF 27 HCA COPYRIGHT 2005 ACS on STN
131:26979 Growth of a **single-wall carbon nanotube** in the gap of scanning tunneling microscope. Yamashita, J.; Hirayama, H.; Ohshima, Y.; Takayanagi, K. (Interdisciplinary Graduate School of Science and Engineering, Department of Materials Science and Engineering, Tokyo Institute of Technology, 4259 Nagatsuda, Yokohama, 226-8502, Japan). Applied Physics Letters, 74(17), 2450-2452 (English) 1999. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB **Single-wall carbon nanotubes** (SWNTs) were grown in the tunneling gap of a scanning tunneling microscope (STM). The authors could observe their growth processes in situ by operating the STM in a transmission electron microscope. The STM tip and sample were **covered** by graphite **layers**. The tip was lightly touched to the sample and subsequently retracted. Occasionally, a carbon nanobridge was generated between the tip and the sample. The bridge had the shape of SWNT at the tip side.

CC 78-1 (Inorganic Chemicals and Reactions)

ST **carbon nanotube single wall** prepn STM

IT **Nanotubes**
RL: PEP (Physical, engineering or chemical process); SPN (Synthetic preparation); PREP (Preparation); PROC (Process)
(**carbon**; growth of **single-wall carbon nanotubes** in gap of scanning tunneling microscope)

IT 7782-42-5, Graphite, reactions
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(growth of **single-wall carbon nanotubes** in gap of scanning tunneling microscope)

L93 ANSWER 25 OF 27 HCA COPYRIGHT 2005 ACS on STN
130:157228 **Carbon nanotubes**-Fe-alumina nanocomposites. Part I: influence of the Fe content on the synthesis of powders. Peigney, A.; Laurent, Ch.; Dumortier, O.; Fousset, A. (Lab. Chim. Mater. Inorg., Univ. Paul-Sabatier, Toulouse, F 31062, Fr.). Journal of the European Ceramic Society, 18(14), 1995-2004 (English) 1998. CODEN: JECSER. ISSN: 0955-2219. Publisher: Elsevier Science Ltd..

AB Oxides based on α-alumina and containing various amts. of Fe (2, 5, 10, 15 and 20 cat%) were prepared by decomposition and calcn. of the corresponding mixed-oxalates. Selective reduction of the oxides in a H2-CH4 atmosphere produces nanometric Fe particles which are active for the in-situ nucleation and growth of **carbon nanotubes**. These form bundles smaller than 100 nm in diameter and several tens of micrometers long. However, the **carbon nanotubes**-Fe-Al2O3 nanocomposite powders may also contain Fe carbide nanoparticles as well as undesirable thick, short carbon tubes and thick graphene **layers covering** the Fe/Fe carbide nanoparticles. The influence of the Fe content and the reduction temperature on the composition and micro/nanostructure of the

nanocomposite powders have been investigated with the aim of improving both the quantity of nanotubes and the quality of carbon, i.e. a smaller average tube diameter and/or more carbon in tubular form. A higher quantity of **carbon nanotubes** is obtained using α-Al1.8Fe0.2O3 as starting compound, i.e. the maximum Fe concentration (10 cat%) allowing to retain the monophase solid solution A further increase in Fe content provokes a phase partitioning and the formation of a Fe2O3-rich phase which upon reduction produces too-large Fe particles. The best carbon quality is obtained with only 5-at% Fe (α-Al1.9Fe0.1O3), probably because the surface Fe nanoparticles formed upon reduction are a bit smaller than those formed from α-Al1.8Fe0.2O3, thereby allowing the formation of **carbon nanotubes** of a smaller diameter For a given Fe content (≤ 10 cat%), increasing the reduction temperature favors the quantity of nanotubes because of a higher CH4 supersatn. level in the **gas atmospheric**, but also provokes a decrease in carbon quality.

CC 57-8 (Ceramics)
Section cross-reference(s): 55, 78

ST **carbon nanotube** synthesis starting powder quality iron content

IT **Nanotubes**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(**carbon**; effects of Fe content and reduction temperature on properties of Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the nanocomposite powders as nucleation catalysts)

IT 74-82-8, Methane, processes
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(carbon source; effects of Fe content and reduction temperature on properties of Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the nanocomposite powders as nucleation catalysts)

IT 116328-49-5, Aluminum iron oxide Al1.6Fe0.4O3 124333-00-2, Aluminum iron oxide Al1.7Fe0.3O3 124333-01-3, Aluminum iron oxide Al1.8Fe0.2O3 126304-65-2, Aluminum iron oxide Al1.9Fe0.1O3 145896-42-0, Aluminum iron oxide Al1.96Fe0.04O3
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(catalyst precursor; effects of Fe content and reduction temperature on properties of Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the nanocomposite powders as nucleation catalysts)

IT 1302-74-5P, Corundum (Al2O3), preparation 1344-28-1P, Aluminum oxide (Al2O3), preparation
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(catalyst support; effects of Fe content and reduction temperature on properties of Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the

nanocomposite powders as nucleation catalysts)
IT 7439-89-6P, Iron, preparation
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); PREP (Preparation); PROC (Process); USES (Uses)
(catalyst; effects of Fe content and reduction temperature on properties of
Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the nanocomposite powders as nucleation catalysts)
IT **7440-44-0P, Carbon**, preparation
RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); PROC (Process); USES (Uses)
(**nanotubes**; effects of Fe content and reduction temperature on properties of Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the nanocomposite powders as nucleation catalysts)
IT 1309-37-1, Iron oxide (Fe2O3), formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(secondary phase; effects of Fe content and reduction temperature on properties of Fe-alumina nanocomposite powders and on yield and quality of **carbon nanotubes** prepared using the nanocomposite powders as nucleation catalysts)

L93 ANSWER 26 OF 27 HCA COPYRIGHT 2005 ACS on STN
130:43745 Wetting of single shell **carbon nanotubes.**
Dujardin, Erik; Ebbesen, Thomas W.; Krishnan, Ajit; Treacy, Michael M. J. (Lab. Chimie Interactions Moleculaires, College France, Paris, F-75231, Fr.). Advanced Materials (Weinheim, Germany), 10(17), 1472-1475 (English) 1998. CODEN: ADVMEW. ISSN: 0935-9648. Publisher: Wiley-VCH Verlag GmbH.
AB Wetting expts. using different liqs. were performed on single shell **C nanotubes** (diameter: 1.4-2.4 nm; raw, oxidized, or annealed samples) synthesized by the laser-oven ablation method. TEM examns. were used to confirm the presence or absence of a wetting material on the nanotubes; its chemical nature was checked by **x-ray** energy dispersion spectroscopy. Raw, oxidized, and annealed samples gave similar results within the available values of γ (γ = surface tension of the liquid). The transition from wetting to nonwetting occurred between 130 and 190 mN/m. Below that threshold, the liquid wetted the surface of the nanotubes at least partially. In this case, TEM micrographs showed nanotubes **covered** with a **film** or decorated with solidified droplets of the wetting liquid For liqs. with a surface tension beyond the cutoff value, no droplets nor films were found wetting the nanotubes. The results are compared to wetting expts. on multi-shell nanotubes.
CC 66-4 (Surface Chemistry and Colloids)
ST wetting liq single shell **carbon nanotube**; surface tension wetting liq **carbon nanotube**
IT **Nanotubes**

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(**carbon**; wetting of single shell **carbon nanotubes**)

IT Wetting
(of single shell **carbon nanotubes**)

IT Surface structure
Surface tension
(of single shell **carbon nanotubes** after wetting with different liqs.)

IT 1304-76-3, Bismuth oxide (Bi2O3), uses 1314-62-1, Vanadium pentoxide, uses 1317-36-8, Lead oxide (PbO), uses 7439-92-1, Lead, uses 7439-97-6, Mercury, uses 7440-46-2, Cesium, uses 7440-55-3, Gallium, uses 7697-37-2, Nitric acid, uses 7704-34-9, Sulfur, uses 7782-49-2, Selenium, uses 13494-80-9, Tellurium, uses
RL: NUU (Other use, unclassified); USES (Uses)
(wetting liquid; wetting of single shell **carbon nanotubes**)

IT 7440-44-0, Carbon, properties
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(wetting of single shell **carbon nanotubes**)

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128:251990 Fullerene macro structures. Koprinarov, N. S.; Marinov, M. V.; Pchelarov, G. V.; Konstantinova, M. A. (Bulgarian Academy of Sciences, Central Laboratory on Solar Energy and New Energy Sources, Sofia, 1784, Bulg.). Chemical Physics Letters, 285(1,2), 1-6 (English) 1998. CODEN: CHPLBC. ISSN: 0009-2614. Publisher: Elsevier Science B.V..

AB At an arc discharge with CH4 present in the gas ambient, conditions were created stimulating the simultaneous formation of **single layer** fullerene structures, which after being **covered** by many **layers**, yield multiple layer structures. As a result, well formed regions containing numerous spherical, conical and polyhedral macro forms of the order of several micrometers were grown. Also obtained were regions containing large quantities of nanotubes over 10 μm in length. A model is proposed to explain how the structure is built up. To aid in the pyrolytic growth of **cover layers**, the temperature of the deposit was maintained high by the "inverse method".

CC 78-1 (Inorganic Chemicals and Reactions)
Section cross-reference(s): 66, 75

ST fullerene **carbon nanotube** surface structure prepn

IT **Nanotubes**
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(**carbon**; preparation of fullerene macrostructures and **carbon nanotubes** by arc discharge in presence of methane)

IT Surface structure

(preparation of fullerene macrostructures and **carbon nanotubes** by arc discharge in presence of methane)

IT Fullerenes
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(preparation of fullerene macrostructures and **carbon nanotubes** by arc discharge in presence of methane)

IT 74-82-8, Methane, reactions
RL: NUU (Other use, unclassified); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)
(preparation of fullerene macrostructures and **carbon nanotubes** by arc discharge in presence of methane)

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